A New Predictive Theory of Presupposition Projection

We propose a theory that derives the projections of presuppositions in the arguments of functions from the (static, bivalent, extensional) truth-conditional semantics of the functions, yielding fine-grained predictions about projection behavior and addressing some empirical and theoretical concerns about dynamic accounts of presupposition projection.

Some problems for a theory of projection

Theories of presupposition projection in the dynamic semantics tradition (e.g. [2]) have generally made few predictions about how truth-conditional meaning can combine with projection behavior - there are many functions on CCPs that correspond to the truth-function of logical conjunction, but only one makes good projection predictions for natural language conjunction (see [4] for related concerns). These theories usually resort to case-by-case stipulation, and so make no predictions about projection under functions that they don't mention explicitly. Further, new data have called into question the empirical claims of some earlier work on projection. In particular, presuppositions in restrictors of quantifiers often project weakly or not at all (for most speakers, (1) pesupposes either nothing at all or that there is at least one employed female topologist), and different quantifiers give rise to different inferences about presuppositions in their nuclear scope (for example (2-a) and (2-b) entail (2-e) while (2-c) and (2-d) apparently do not[1]).

(1) Every topologist who dislikes her employer drinks.

(2)
a. None of these students have stopped smoking.
b. Each of these students has stopped smoking.
c. More than three of these students have stopped smoking.
d. Exactly three of these students have stopped smoking.
e. Each of these students has at some point smoked.

Sketch of the theory

A third truth value, written #, represents presupposition failure - sentences with untrue presuppositions have value #, and predicates that make presuppositions map items that lack the presupposed properties to #. Functions are defined over domains on non-presuppositional values - the action of functions on presuppositional arguments comes from the machinery defined below. For truth-functions, the semantics understands the value of # as uncertain between the alternatives 0 and 1.[2] If both choices yield the same output, given the other arguments, that is the output of the function.[3]

This yields the strong Kleene [3] trivalent semantics for connectives; we augment it by further requiring that, considering the arguments of a function in order, no argument can have presuppositional content that rules out the possibility that the output is 1 - if some argument violates this rule, we set the output to #. Formally, we consider the set of items presupposition-equivalent to an argument, where 0 and 1 are mutually presupposition-

[1]This general pattern is consistent with the statistical generalizations of [1], although it must be admitted that in that study speakers inferred a universal about half the time even from (2-d).

[2]That is, 0 and 1 are the *alternatives* for # - alternatives for predicates are discussed below.

[3]For example, (0 *and* #) takes the value 0, since (0 *and* 0)=(0 *and* 1)=0), but if the alternatives produce different outputs, the function returns # (so (1 *and* #) takes the value #.

equivalent and # is equivalent only to #, and two predicates are equivalent if they map exactly the same entities to #. For an argument x preceded by arguments $y_1, ...y_k$ (the list may have length 0), we require that one of the following criteria holds:

(i) There are no non-presuppositional $u_1, ..., u_m$ such that $f(y_1, ..., y_k, u_1, ..., u_m) = 1$, evaluated under the rule defined above.[4]

(ii) There are some x' presupposition-equivalent to x and some non-presuppositional values $z_1, ..., z_n$, such that $f(y_1, ..., y_k, x', z_1, ..., z_n) = 1$ (again under the strong Kleene definition of function application).[5]

We adopt a new notion of function 'deployment', distinct from the function application already considered, written $f[\vec{w}]$ instead of $f(\vec{w})$, where $\vec{w}$ is an argument list. If either (i) or (ii) is satisfied, then $f[\vec{w}] = f(\vec{w})$ as defined perviously. Otherwise, $f[\vec{w}] = \#$.[6]

To extend this to quantifiers, we define the set of (non-presuppositional) alternatives for a presuppositional predicate p. The set of alternatives depends on which entities that *matter* for the function f with respect to the argument position of p.[7] For quantifiers the entities that matter when evaluating the restrictor are all entities, and those that matter when evaluating the nuclear scope are all the entities in the restrictor. Let $p^{0/\#}$ be such that $p^{0/\#}(x) = 1$ iff $p(x) = 1$ and 0 otherwise, and let $p^{1/\#}(x)$ be 0 when $p(x) = 0$ and otherwise 1. If p maps at least one entity that matters for f to 1, then the set of alternatives for p is $\{p^{0/\#}\}$; otherwise, it is $\{p^{0/\#}, p^{1/\#}\}$.

We now get a weak presupposition for (1) - if there is even one topologist who dislikes an entity by which she is employed, then the restrictor denotation p maps something to 1, so its only alternative is $p^{0/\#}$; the requirement that the presuppositions allow an output of 1 is satisfied, so unless $p^{0/\#}$ is empty, the sentence is true iff every entity in $p^{0/\#}$ drinks. Considering the nuclear scope q of (2-a), suppose some student has never smoked and consider any q' presupposition-equivalent to q. If q' maps any student to 1, then evaluating at the alternative $q'^{0/\#}$ will make *no* output 0, and if q' maps all students to 0, then $q'^{1/\#}$ and $q'^{0/\#}$ are both alternatives for q', and these produce different results with *no* so evaluation yields #: no choice of q' gives us an output of 1, so if there are any never-smoking students then the truth value of (2-a) is #. If the student former smokers are three, the system makes (2-d) true, since the only alternative we need to consider maps all never-smokers to 0. We also predict universal presuppositions for (2-b) but not (2-c).

References

[1] Chemla, E. 2007. 'Presuppositions vs. Scalar Implicatures', XPRAG.

[2] Heim, I. 1983. 'On the Projection Problem for Presuppositions', WCCFL 2.

[3] Kleene, S. 1952. *Introduction to Metamathematics*. North Holland, Amsterdam.

[4] Soames, S. 1989. 'Presupposition'. *Handbook of Philosophical Logic IV*.

[4]This is the case where 1 can't be the output but the presuppositions of x are not to blame.

[5]This is the case where the presuppositional content of x does not rule out the output being 1.

[6]This gives us asymmetry of projection for *and* but not for *or* - an empirically appealing contrast.

[7]A formal definition of this notion of *mattering* is possible, but not in the allotted space.